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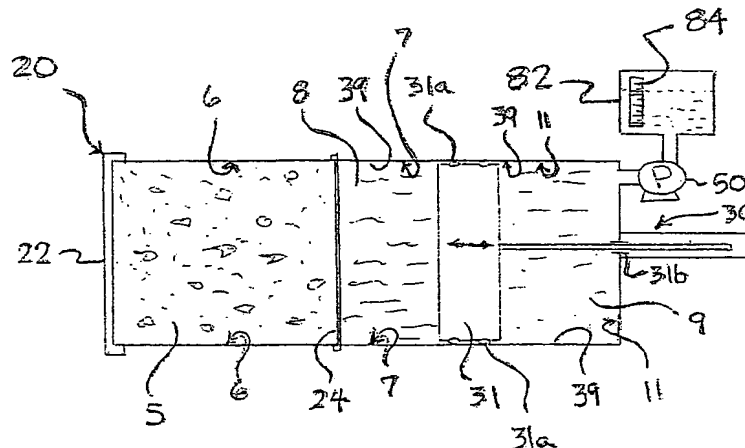
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(54) Title: TEST APPARATUS FOR DIRECT MEASUREMENT OF EXPANSION AND SHRINKAGE OF OIL WELL CE-  
MENTS



(57) Abstract: A test apparatus for the measurement of expansion and/or shrinkage of a cement test sample during curing under pressure and temperature conditions that simulate downhole oil well conditions isolates the test sample from a first fixed volume of incompressible pressurized liquid using a flexible barrier that forms a wall of a first chamber in a pressure vessel assembly. The first chamber is sealed by a movable piston. A second pressurizing medium is contained in a second chamber on the opposite side of the piston, and is in fluid communication with a pump, whereby the piston is pressure-balanced between the first and the second medium. The piston moves in a bore of the vessel assembly in response to changes in the volume of the test sample during curing and the amount of linear movement of the piston is detected by a sensor system that measures, correlates and transmits any change in the position of the piston as a change in the sample volume for display and recording.

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